

## Room Design Method and Concealed Spaces

When performing hydraulic calculations for a fire sprinkler system, one of the critical questions that need to be answered is, “how many sprinklers are likely to open if there is a fire in this space?” One of the acceptable ways to answer this question is, “all of the sprinklers in the room in question, as long as the walls are sufficient to keep the fire in the room once the sprinklers control it.” This concept is known in NFPA 13 as the “Room Design Method” and is in section 11.2.3.3 of the 2013 edition (similar sections in previous editions).

A frequent question regarding the Room Design Method is whether that method can be used in concealed spaces and attics. The answer depends on your definition of a “room”. NFPA 13 does not define the term “room”. While the term “compartment” is defined, the name of the design method is not the “Compartment Design Method”, so the definition of a compartment is intentionally not being used by the committee. Instead, we need to think more about the concept of a “room”.

Webster’s Dictionary defines a room as, “a partitioned part of the inside of a building.” Using this definition, an Authority Having Jurisdiction (AHJ) could certainly allow the use of the room design method in an attic or concealed space as long as the partitions met the appropriate fire resistance rating to satisfy section 11.2.3.3.

There has been some concern expressed within the fire

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sprinkler industry regarding the use of the Room Design Method in concealed spaces and attics due to the reality that people don't frequently go into these spaces and they might not notice if the integrity of the partitions has been violated. In other words, if the sprinkler contractor uses the room design method and verifies that the partitions are appropriate and are in place during the sprinkler system installation, and later the partitions are violated by an HVAC contractor, plumber, electrician, or a large rodent, who is ever going to see this problem in order for it to be fixed?

NFPA 25 exempts sprinklers from being inspected that are in concealed spaces. A true NFPA 25 inspection does not look at the walls of the building anyway, so even when the room design method is used in office buildings and hotels, there is nobody looking to see if the walls have remained continuous. It is interesting to note that while water-based fire protection systems need to be inspected and tested in accordance with NFPA 25, there is no corresponding inspection or testing standard or code for building components. Compartmentation is widely recognized as an important fire protection "system" consisting of walls, ceilings, floors and doors, but who inspects these components to determine whether they are staying in place and how are they documenting that the sprinkler system counted on those partitions being in a specific location?

Since the use of the Room Design Method relies so heavily on the compartment partitions being kept in place, it is important to be careful when using it. If the sprinkler contractor wants to use the Room Design Method in an attic or concealed space, consideration should be given to warning the General Contractor about maintaining the condition of the partitions during the construction of the building. In addition, the building



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owner should be informed as to the importance of maintaining the condition of the partitions throughout the life of the building. Periodic inspections of the partitions would not be a bad idea for the building owner to conduct if the concealed space or attic has access.



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